CURRICULUM VITAE

A. Personal Information:

Name in Full	Ashit Talukder, Ph.D.
Business Address	Jet Propulsion Laboratory California Institute of Technology MS 300-123 4800 Oak Grove Drive, Pasadena, Los Angeles, CA 91109
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B. Education:

University	Carnegie Mellon University, PhD., Electrical and Computer Engineering, 1999
University	Iowa State University, M.S., Electrical and Computer Engineering, 1994

C. Professional Background:

Academic and Research appointments

Senior Researcher, **Level A**, Jet Propulsion Laboratory / NASA / California Institute of Technology, 2002 - Current

Senior Researcher, Jet Propulsion Laboratory / NASA / California Institute of Technology, 1999 - 2002

Adjunct Research Assistant Professor, University of Southern California/ CHLA, 2002 – Current

Major Areas of Research and Development Activities

Intelligent and Autonomous Systems
Machine Learning
Pattern Recognition and Data Mining
Image, video and Signal Processing
Artificial Intelligence

Resource management and policy-based management
Controls and distributed systems, Distributed Controls
Model-based control, diagnosis and prediction
Advanced computational algorithms and Optimization
Human Assistive Devices
Computer Vision
Robotics
Sensor Networks

Leadership and Management Roles in Relevant Projects

Responsible for hiring, administration, supervision, management and oversight of research team comprised of 6 staff members and post-docs for past five years at the University of Southern California, CHLA. Job functions include:

(a) Recruitment of entire team
(b) Administrative oversight, ranking and annual reviews of each staff member
(c) Technical oversight of group member's tasks
(d) Mentoring staff members, post-docs and interns
(e) Lead and manage technical projects, and ensure timely completion of milestones and deliverables to customers
(f) Interact with sponsor

Interactions and presentations to sponsors as Principal Investigator and technical leader in multiple projects at JPL and University of Southern California over past 9 years.

Co-advising PhD candidate, Shuping Liu, in the Department of Electrical Engineering at University of Southern California

Predictive Model-Based Control and Resource Management in wide-area distributed sensor networks for coastal and terrestrial systems (Principal Investigator, Sponsor: NASA-ESTO and JPL) – Led team of 2 post-docs, two JPL senior staff and one JPL Affiliate. Subcontract team comprised of graduate students, post-docs and faculty at Stevens Institute of Technology and UCLA.

Distributed algorithms for Global Multisensor Cyclone Detection (Principal Investigator, Sponsor: NASA) – Leading team of 2 post-docs, three JPL senior and staff members (with JPL co-I).

Signal Processing and Computational Algorithms for Remote Human Vital Signs Monitoring and Bio-Identification (Signal Processing and Machine

Learning Technical Lead, Sponsor: AGA) – Leading data processing and signal processing team comprised of two JPL staff, and one post-doc for the past four years

Resource management, pattern recognition and advanced computing techniques for mobile sensor networks for integrated health monitoring (Principal Investigator, Sponsor: NIH) – Leading team of 6 staff members at USC/CHLA for past five years.

Distributed Fault-Tolerant Control of Resource Constrained Sensor Networks (Principal Investigator, Sponsor: NSF) – Leading team of 2 research staff and co-advising one graduate student in EE Dept at USC.

Dynamic scene perception for intelligent robotics (Co-I, Sponsor: DARPA)

Computer vision and object recognition for robots and unmanned vehicles (Co-I, Sponsor: DARPA)

Computer Vision Eyetracker technology to assist handicapped individuals (Co-I, Sponsor: NASA)

Synergistic Technical and Leadership Skills

- Extensive experience and knowledge of resource and policy-based management, model-based control, predictive control, optimization, and advanced computational techniques such as machine learning, pattern recognition, image processing and computer vision techniques applied in practical settings for real-world applications
- Ability to work in multi-disciplinary environments through interactions with science PIs at JPL and external institutions
- Experience with development and management of data processing software for sensors and instrument systems
- Experience leading groups of 3-6 staff members, post-docs in research projects spanning several years
- Extensive experience interacting with sponsors, writing proposals, and bringing in new sources of funding
- Significant experience in planning cost estimating, budgeting, tracking and reporting work in progress as leader and PI of technical teams within JPL and at USC/CHLA on research grants
- Participated in Effective Leadership and Management Workshop in JPL Section (top ranked candidates in Section selected by Section Management to participate in the workshop)

Honors and Awards

Premium Award for Academic Excellence, Iowa State University, 1992
NASA Space Act Award 2002 for development of novel biomedical technologies
Honorary Special Mention Paper Award at the IEEE Intl. Conference on Intelligent Sensors and Information Processing
NASA Space Act Award 2005 for development of remote astronaut eyegaze monitoring systems

Professional Service

1. Conference session chair for Optical Pattern Recognition XIV at 2005 SPIE Conference on Aerospace/Defense Sensing, Simulation, and Controls, Orlando, FL
2. Co-Chair of the International Conference on Digital Telecommunications (ICDT 2006)
3. Chair of the IMAGE 2006 Conference (held and organized under ICDT 2006)
4. Conference session chair for Optical Pattern Recognition XIV at 2003 SPIE Conference on Aerospace/Defense Sensing, Simulation, and Controls, Orlando, FL
5. Chaired session on "Active Vision in Robotics" at 1998 SPIE conference on "Intelligent Robots and Computer Vision XVII: Algorithms, Techniques, and Active Vision"
6. Chaired two sessions at 1998 SPIE Conference on Aerospace/Defense Sensing, Simulation, and Controls, Orlando, FL
7. Reviewer/referee on IEEE Transactions on Image Processing
8. Reviewer/referee on IEEE Transactions on Signal Processing
9. Reviewer/referee on IEEE Transactions on Systems, Man and Cybernetics - Part B
10. Reviewer/referee on Pattern Recognition journal
11. Reviewer/referee on Neurocomputing journal
12. Reviewer/referee on Applied Optics journal
13. Reviewer/referee on Optical Engineering journal.
14. Reviewer/referee on the Computer Vision and Pattern Recognition Conference (CVPR) 2003

15. Reviewer for IEEE/RSJ Intelligent Robots and Systems Conference (IROS 2005)
16. Reviewer for IEEE/ACS International Conference on Computer Systems and Applications (AICCSA-05)
17. Technical review committee member of JPL/NASA R&TD proposals
18. Technical committee member of the **SPIE Defense and Security Symposium, Optical Pattern Recognition Conference**
19. Chair of session on "OPTICAL PATTERN RECOGNITION XVI: Pattern Recognition Applications", at the **SPIE Defense and Security Symposium** 2005
20. Chair of session on "Special Situations in Telehealth and Telemedicine", at the **International Telemedicine Conference**, March 2005

Other employment or activity

Member, Society for Photo Optical Instrumentation Engineers,
Organizing Committee Member, SPIE Defense and Security Symposium

Committee membership

Nationally/Internationally
Organizing Committee Member, SPIE Annual Defense and Security Symposium, Optical Pattern Recognition, 2001- Current

Co-Chair and Technical Organizing Committee Member of the International Conference on Digital Telecommunications (ICDT 2006)

Chair of the IMAGE 2006 Conference (held and organized under ICDT 2006)

Chair and Technical Organizing Committee Member**,** Session on *Special Situations in Telehealth*, International Conference on Telemedicine, March 2005

Chair, Intl. Conference on Sensors and Related Networks, Dec. 2007

D.

Research Grants in Past Five Years

1. Predictive Model-Based Control and Resource Management in wide-area distributed sensor networks for coastal and terrestrial monitoring systems (CARDS),

Sponsor: NASA Applied Information Systems Technology (AIST) Program,
Total Award: $400,000
2006-2008 Principal Investigator

2. Resource management, pattern recognition and advanced computing techniques for mobile sensor networks for integrated health monitoring,
   Sponsor: National Institute of Health (NIH).
   Total Award: $4.0 million .
   2003-2008 Principal Investigator

3. DEFT (Distributed Embedded Fault-Tolerant Control of Resource Constrained Sensor Networks), National Science Foundation, NSF Computer Systems Research (CSR) Program, Program Manager: Dr. Helen Gill
   2006 –2008 Principal Investigator
   Total award: $100,000

4. Autonomous Control and Resource Management in Heterogeneous Sensor Webs: ARMS.
   JPL DRDF
   2006 – 2008 Total award: $50,000
   Principal Investigator

5. Global Cyclone Detection and Tracking with Multiple Sensors: GLYDER.
   NASA AISR Program, NASA
   2006 – 2010 Total award: $650,000
   Principal Investigator

6. Pattern Recognition for Remote Vital Signs Monitoring and Remote Personnel Identification using microwave signals.
   AGA,
   $4 million, 2004-2009,
   Co-Investigator, Technical Lead for Signal processing and machine learning

7. Dynamic Scene Perception in Urban Environments, DARPA
   DARPA, $3.2 million
   2001-2003, Co-Investigator

8. Digital Personnel,
   NGMTec, Co-Investigator $220000

9. Co-Investigator in funded DARPA IPTO Mobile Robot Software Program
   Learning Autonomous Terrain Classification for Cross-Country Navigation
   (**Total Award: $800,000**).

Patents and Inventions

1. Provisional Patent "Remote Cardiac Monitor for personnel identification", filed through the California Institute of Technology Intellectual Property Office for work on Remote Cardiac Monitoring using Microwave signals.
2. Patent (NPO-30417) "Automated Intra-oral plaque analysis system" filed through the California Institute of Technology Intellectual Property Office for work on Colgate-Palmolive funded PlaqTrak System (Nov 2001).
3. Provisional Patent (JPL and NASA Case No. NPO 30700) " Novel System Software and Hardware Architecture for Optimized Real-time Non-invasive Eyetracking", filed through the California Institute of Technology Intellectual Property Office for work on NASA-funded Eyetracker for Biomedical Applications.

BIBLIOGRAPHY

PEER REVIEW JOURNALS

1. “Eye-tracking architecture for biometrics and remote monitoring”, Ashit Talukder, John-Michael Morookian, Steve Monacos, Raymond Lam, Clayton LeBaw, James L. Lambert, **Applied Optics**, Vol 44, No. 5, pp. 693-700, Feb 2005.
2. “Obstacle Detection and Terrain Classification for Autonomous Off-Road Navigation”, R. Manduchi, A. Castano, A. Talukder, L. Matthies, **Autonomous Robots**, 18:81-102, 2005
3. “Motes for mobile sensor networks in health monitoring and telemedicine”, CrossBow Technologies Quarterly Industrial Newsletter, Featured Article, Q2, 2005
4. “Mapping the mesoscale interface structure in polycrystalline materials”, Wu, C.T.; Adams, B.L.; Bauer, C.L.; Casasent, D.; Morawiec, A.; Ozdemir, S.; Talukder, A. **Journal of Ultramicroscopy**, Volume: 93 (2), 99-109, 2002
5. “A closed-form neural network for discriminatory feature extraction from high-dimensional data”, A. Talukder and D. Casasent, **Neural Networks**, Vol 14, No. 9, Nov. 2001, pp. 1201-1218.
6. "Nonlinear features for improved pattern recognition", David Casasent, A. Talukder, **Book Chapter** in **Optical Information Processing: A Tribute to Adam Lohmann**, H. John Caulfield (Editor), SPIE Press, 2002
7. “General Methodology for Simultaneous Representation and Discrimination of Multiple Object Classes”, A. Talukder and D. Casasent, **Optical Engineering Journal** (**Advances in Recognition Techniques**), Vol 37, No. 3, Mar. 1998.
8. “Detection and Segmentation of Items in X-Ray Imagery”, David Casasent, A. Talukder, P. Keagy, T. Schatzki. **Transactions of the ASAE**. Vol. 44(2): 337–345, 2001.
9. "Classification of Pistachio Nuts from X-ray Images", David Casasent, Ashit Talukder, Thomas F. Schatzki and Pamela M. Keagy, Accepted for publication at **the Intl. Journal for Food Science and Technology (LWT) published by the International Union of Food Science, and Technology**, Academic Press, London. (April 2003)
10. “Clinical Evaluation of a Novel Interstitial Fluid Wireless Sensor System for Remote Continuous Health Monitoring”, M. Faupel, Ashit Talukder, et. al., **IEEE Sensors Journal**, Nov. 2007

ARTICLES IN PREPARATION

11. “Markov Decision Processes for Real-time Control in Wireless Distributed Sensor Networks”, Ashit Talukder, A. Panangadan and S.Ali, Machine Learning Journal (In Preparation)

PEER REVIEW CONFERENCES

12. S.-S. Ho and A. Talukder, Automated Cyclone Discovery and Tracking using Multiple Heterogeneous Satellite Data, **14th ACM SIGKDD Int. Conf. on Knowledge Discovery and Data Mining**, Las Vegas, NV, 24-27 Aug, 2008.
13. S.-S. Ho and A. Talukder, Cyclone Tracking Using Multiple Satellite Data Sources via Spatial-Temporal Knowledge Transfer, **AAAI-08 workshop, Transfer Learning for Complex Tasks**, Chicago, IL, 14 July, 2008.
14. A. Talukder, S.-S. Ho, T. Liu, W. Tang, A. Bingham, and E. Rigor, Global Cyclone Detection and Tracking using Multiple Remote Satellite Data, **NASA Earth Science Technology Conference ESTC-2008**, Aldephi, MD, 24 June, 2008.
15. S.-S. Ho and A. Talukder, Automated Cyclone Identification from Remote QuikSCAT Satellite Data, **IEEE Aerospace Conference 2008**, Big Sky, MT, Mar. 1-8, 2008.
16. "Dynamic Control and Power Management Algorithm For Continuous Wireless Monitoring in Sensor Networks", Ashit Talukder, et. al., 29th Annual IEEE International Conference on Local Computer Networks (LCN'04) , November 16 - 18, 2004 , Tampa, Florida, USA, pp. 498-505 EmNets Workshop
17. "Dynamic Control and Resource Management in Distributed Sensor Network Systems", Ashit Talukder and A. Panangadan, SENNET'07, Dec 2007.
18. "Model Predictive Control of a Coastal Monitoring Sensor Network", Ashit Talukder and A. Panangadan, IEEE Aerospace Conf. March 2008.
19. "Predictive Controller for Heterogeneous Sensor Network Operation in Dynamic Environments", A. Talukder, S. Ali, A. Panangadan and L. Chandramouli, IEEE IROS 2005, August 3, 2005.
20. "Markov Decision Processes for Control of a Sensor Network-based Monitoring System", Anand Panangadan and Syed Muhammad Ali and Ashit Talukder, Seventeenth Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-05).
21. "Autonomous Resource Management and Control Algorithms for Distributed Wireless Sensor Networks" Ashit Talukder, et. al., The 3rd ACS/IEEE International Conference on Computer Systems and Applications (AICCSA-05), Jan. 2005
22. "Optimal sensor scheduling and power management in sensor networks", A. Talukder, SPIE Defense and Security Symposium, April 2005.
23. "Real-time visual odometry and moving object segmentation from moving robots", A. Talukder, L. Matthies, **IROS 2004,** 2004 IEEE/RSJ International Conference on Intelligent Robots and Systems
24. "Real-time detection of moving objects in a dynamic scene from moving robotic vehicles", ", A. Talukder, S. Goldberg, L. Matthies, and A. Ansar, Oral Presentation at the IEEE Intelligent Robots and Systems Conference (IEEE IROS) 2003.
25. "Fast and Reliable Obstacle Detection and Segmentation for Cross-country Navigation", A. Talukder, R. Manduchi, L. Matthies, and A. Rankin, IEEE Intelligent Vehicles Symposium 2002, June 2002, France.
26. "Autonomous Terrain Characterisation and Modelling for Dynamic Control of Unmanned Vehicles", A. Talukder, R. Manduchi, R. Castano, K. Owens, L. Matthies,

A. Castano, R. Hogg, IEEE Intelligent Robots and Systems Conference (IEEE IROS) 2002, Switzerland, Sept 30-Oct 2, 2002

27. “Real-time Non-Invasive Eyetracking and Gaze-point Determination for Human-Computer Interaction and Biomedicine”, Ashit Talukder, John-M. Moorokian, S. Monacos, R. Lam, C. LaBaw, 2nd WSEAS Int. Conf. on Signal, Speech and Image Processing (ICOSSIP 2002), Greece, Sept 28-30, 2002.
28. "Adaptive activation function neural net for face recognition" (Tracking ID: 30629), David Casasent, A. Talukder, Intl. Joint Conf. Neural Networks (IJCNN) 2001, Jul. 2001
29. "Nonlinear features for improved pattern recognition", David Casasent, A. Talukder, Proc. SPIE AeroSense Conference, April 2001, Orlando, Florida.
30. D. P. Casasent, A. Talukder, “Nonlinear features for pose invariant face recognition”, Proc. SPIE Wavelet Applications VIII, Aerosense Technologies and Systems for Defense & Security, Vol. 4391, April 2001.
31. "Face recognition with pose variations", David Casasent, A. Talukder, Proc. SPIE Vol. 4197, p. 1-4, Intelligent Robots and Computer Vision XIX: Algorithms, Techniques, and Active Vision, Oct. 2000
32. “Neural Net with Adaptive Functions for Face Recognition”, David Casasent, A. Talukder, Intl. Joint Conf. Neural Networks (IJCNN) 2000, Jul. 2000
33. “Pose Invariant Recognition of Faces with Unknown Pose”, A. Talukder and D. Casasent, Intl. Joint Conf. Neural Networks (IJCNN) 1999 (and journal paper in preparation), Jul. 1999.
34. “Distortion-Invariant Object Representation and Discrimination Using an FST Neural Net”, D. Casasent, M. Sipe and A. Talukder, 1998 Intl. Joint Conf. on Neural Networks (IJCNN’98), May 1998.
35. "Accurate Multiscale Gabor Wavelet Fusion for Edge Detection in Microscopy Images" (Invited Paper), A. Talukder, D. P. Casasent, Proc. SPIE, Wavelet Applications V, 3391, Apr. 1998 (Also printed in Selected Key SPIE Papers on CD-ROM series, Vol 8: Mathematical Imaging and Vision, Ed. Dr. Gerhard Ritter, Dec. 1999).
36. "Automated Estimation of Class and Pose of Machined Parts", A. Talukder and D. Casasent, Robotics and Machine Perception Newsletter, 1999.
37. "Pose Estimation and Transformation of Faces from Single Views", A. Talukder and D. Casasent, Proc. SPIE: Robots and Computer Vision XVII, Nov. 1998
38. "Classification and Pose Estimation of Objects using Nonlinear Features", A. Talukder and D. Casasent, Proc. SPIE: Applications and Science of Computational Intelligence, Vol. 3390, Apr. 1998.
39. "Classification of Product Inspection Items Using Nonlinear Features", A. Talukder and D. Casasent, Proc. SPIE, Optical Pattern Recognition IX, Vol. 3386, Apr. 1998.
40. "X-Ray Sensor Agricultural Product Inspection" (Invited Article), A. Talukder and D. Casasent. Robotics and Machine Perception Newsletter (special issue on Machine Vision), 1998, p. 9-11.
41. "X-Ray Agricultural Product Inspection: Segmentation and Classification", D. Casasent, A. Talukder, H.W. Lee. Proc. SPIE, Intelligent Systems & Advanced Manufacturing, 3205, Oct. 1997.

42. "Image processing for grain boundary detection in microscope images", A. Talukder, D. Casasent and S. Ozdemir, Proc. International Grain Growth Conference (ICGG-3), Jun. 1998.
43. "Detection of bands in backscatter microscopy images using new Hough transform techniques", D. Casasent, L. Chen and A. Talukder, Proc. SPIE, Hybrid Image and Signal Proc. VI, Vol. 3389, Apr. 1998.
44. "Real-Time Robust Line Detection in Microscopy Images", A. Talukder and D. Casasent. Proc. SPIE (Intelligent Systems and Advanced Manufacturing), 3208, Oct. 1997.
45. "Joint Recognition and Discrimination in Nonlinear Feature Space", A. Talukder and D. Casasent. Proc. SPIE (Intelligent Systems and Advanced Manufacturing), 3208, Oct. 1997.
46. "Automated Segmentation and Feature Extraction of Product Inspection Items", A. Talukder and D. Casasent. Proc. SPIE (AeroSense), Apr. 1996.
47. "Algorithm fusion for detection with reduced false alarms", Casasent D., Ye A., Talukder A. Proc. SPIE (Optical Pattern Recognition VII), vol.2752, p. 206-213
48. "Feature space trajectory neural net classifier: confidences and thresholds for clutter and low contrast objects", Neiberg L., Casasent D., Talukder A. Proc. SPIE (Applications and Science of Artificial Neural Networks II), vol.2760, p. 435-46.
49. "Detection algorithm fusion concepts for computer vision", Casasent D., Anqi Ye, Talukder, A. Proc. SPIE (Intelligent Robots and Computer Vision XIV), vol.2588, p. 2-9.
50. "Model selection and texture segmentation using partially ordered Markov models", Talukder, A., Davidson, J. 1995 International Conference on Acoustics, Speech, and Signal Processing (ICASSP-95), p. 2527-2530.
51. "Texture analysis using partially ordered Markov models", Davidson, J., Talukder, A., Cressie, N. Proc. ICIP-94 (Proceedings of 1st International Conference on Image Processing), 1994, p. 402-406.

BOOK CHAPTERS

52. "Nonlinear features for improved pattern recognition", David Casasent, A. Talukder, Book Chapter in Optical Information Processing: A Tribute to Adam Lohmann, H. John Caulfield (Editor), SPIE Press, 2002

KEYNOTE ADDRESSES

- **Resource Management and Pattern Recognition in Distributed Sensor Networks**, Keynote Address, International Conference on Sensors and Related Networks (SENNET-07), December 2007
- **Challenges in progressing from Remote Telehealth to Mobile Telehealth**, Keynote Address, International Conference on Telemedicine, March 2005

- "Nonlinear features for robotics, inspection, and face recognition", D. Casasent and A. Talukder**, Keynote Address, Proceedings SPIE: Algorithms, Devices, and Systems for Optical Information Processing III, Conference on Photonics in Computing Systems**, Vol. 3804 Jul. 1999.

INVITED LECTURES

- **Autonomy in Sensors and Sensor Network Systems**, Colloquial Address to Faculty and Students at the Computer Sciences Department, University of South Florida, Tampa, April 2008.
- **Multimodal Approaches to Autonomous Remote and Mobile Telehealth**, Invited Talk at the Session on *Special Situations in Telehealth*, International Conference on Telemedicine, March 2005
- **Nonlinear pattern recognition for robotics and product inspection,** Invited talk at the Osaka University, Japan, Dec 2003**.**
- "Distributed multi-sensor processing, decision making, and control under constrained resources for mobile health monitoring", A. Talukder**, SPIE Defense and Security Symposium, Optical Pattern Recognition XV,** April 2004.

REFERENCES

Available upon Request